

2006-03

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Shrestha, RK

<http://hdl.handle.net/10026.1/16313>

Nepal Med Coll J

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Ocular morbidity among children studying in Private Schools of Kathmandu valley: A prospective cross sectional study

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Abstract:

Introduction

Childhood blindness is among the commonest cause of blind-person year, as the number of years lived with blindness by blind children is almost the same as the total number of blind years due to age related cataract. So, the economical, psychological and social consequence of childhood blindness is manifold.

A study conducted in government schools from Nepal reported prevalence⁷ of myopia to be 4.3%, but no studies have been done among private school students. There have been some reports, which have quoted the association of developmental myopia with, excessive near work. Thus a study was designed to evaluate the children among private schools so as to see whether there is any difference in pattern of ocular morbidity and prevalence of myopia between private and government school children.

Methods and materials

Purposive selection of two private schools was done and students were screened in detail after taking verbal consents from their parents. Student underwent detail ocular evaluation including vision test, cover test, convergence reserve measurement, color vision test, slit lamp Biomicroscopy, Retinoscopy, Subjective refraction and fundus evaluation.

Results

A total of 1816 students were evaluated, out of which 52.8% were males and 47.2 % were females. Among the total, 65.8% had no ocular abnormalities and 34.2% had some form of ocular disorders. Refractive error is the commonest problem seen accounting for 21.8% out of total,

followed by infective disorders, which accounted for 7.2%, 3.5% of them were noted to have Orthoptic problem including various types of strabismus, and 2.2% were color blind.

Conclusion

The prevalence of refractive error among private school children seems to be higher. Color blindness also seems to be prevalent among these children. This kind of school screening would help in detecting the eye problems timely and thus would reduce the ocular morbidity as well as prevents children from going blind unnecessarily.

Key words: Ocular morbidity, blindness, refractive error, color blind

Introduction

Childhood blindness is among the commonest cause of blind-person year, as the number of years lived with blindness by blind children is almost the same as the total number of blind years due to age related cataract.¹ So, the economical, psychological and social consequence of childhood blindness is manifold. With the increasing number of children going blind every year, there has been a fact quoted by WHO that " Every minute a child goes blind" which reflects the ever increasing global burden of childhood blindness².

There are about 5.5 million children in Nepal below 16 years of age and about 3.7 million of them are of school going age (5-15 years)³. There was a survey report originating from Nepal in 1981, which has quoted relatively few cases of childhood blindness. The main causes of blindness among children were quoted to be ocular infection, xerophthalmia and congenital cataract⁴. The Nepal xerophthalmia survey in 1981 has shown that 1.65 % of children below 14 years of age had Bitot's spot presumed to be due to vitamin A deficiency⁵. A refractive error study from the Mechi Zone of Nepal in 1997 has shown that 2.9% of children had visual morbidity of which 56 % was due to refractive error⁶. Similarly, there has been a recent report which has quoted that 11% of the children screened from three schools of Kathmandu Valley had ocular morbidity, 97% out of which being either preventable or treatable⁷.

There has been some report, which has shown the association of developmental myopia with excessive near work⁸. As it is a known fact that load of studies in private schools are much more than government schools and also mode of teaching learning process vary in terms of use of computers etc. The more the load of study more is the chances of having developmental myopia according to the reports, which has been quoted earlier. There have been some studies, which were conducted in government schools from Nepal and one of which has reported prevalence⁷ of myopia to be 4.3%, but no studies have been done among private schools students. Thus a study

was designed to evaluate the children among private schools so as to see whether there is any difference in pattern of ocular morbidity and prevalence of myopia between private and government school children.

Methods and material

Purposive selection of two private schools was done for the study, from bagmati zone of Nepal. A team of an Ophthalmologist, three Optometrists, an ophthalmic assistant and two nurses visited the schools. All the schools were pre-informed and the children willing to have eye examination were pre-registered. Those who did not want to be examined were excluded from the study. Examination was done in consecutive days until all the children were completely examined. Those who required special examination process were brought to Om Hospital and Research center and appropriate management was done. After completion of examination, the lectures were delivered to teachers and all the staffs of the school regarding ocular health and ocular emergencies.

Examination Procedures

Each student underwent following examination:

- Visual acuity test: With the help of internally illuminated Snellen's vision drum kept at six meters distance. The vision was taken unaided, with available glasses and with pinhole according to the need.
- Extra ocular movements, cover tests, convergence test
- Color vision test with Ishihara color plates
- Examination with a torch light
- Slit lamp biomicroscopy: With Haag streit 900 table stand
- Retinoscopy and subjective refraction
- Cycloplegic refraction for those required and followed by subjective refraction (Cyclopentolate 1% eye drop was used)
- Fundus evaluation with direct ophthalmoscope and with the help of 90D lens if needed.
- Fundus of those who had poor vision was evaluated after dilating the pupil.

Diagnostic Criteria

Diagnosis of Myopia was made only when the myopic error was more than -0.5 dioptre spherical and hypermetropia when the error was more than + 0.75 dioptre spherical after cycloplegic refraction. Astigmatism was diagnosed only when the error was more than 0.50 dioptre.

The diagnosis of amblyopia was made if the vision was 6/9 or worse after a careful cycloplegic refraction and meticulous fundus examination through dilated pupil, which helped to rule out other causes for non-improvement of vision. Strabismus was diagnosed by recording simple corneal light reflex, cover tests and prism bar tests and for difficult cases students were referred to Om Hospital for further Orthoptic evaluation.

Color blindness was recorded as per Ishihara color plates. Recording conjunctival dryness and Bitot's spot with or without night blindness determined Vitamin A deficiency.

Results

A total of 1816 students between 5 and 16 years of age were evaluated, out of which 959(52.80%) were males and 857(47.20%) were females. The mean age of male students was 10.65 with SD of 2.70 and similarly the mean age of female students was 10.72 with SD of 2.37. Among the total, 65.8% had no ocular abnormalities and 34.2% (621) had some form of ocular disorders. Pattern of ocular diseases found are given in the table 1. From the table 1 it is seen that refractive error is the commonest problem seen accounting for 21.8% out of total, followed by infective disorders, which accounted for 7.2%, 3.5% of them were noted to have Orthoptic problem which includes convergence insufficiency (1.5%), strabismus (1.3%) and amblyopia (0.7%). Color blindness was 2.2% where as glaucoma suspect 1.7% and congenital anomalies 0.9%. Xerophthalmia was seen in only one, accounting for 0.05% out of total. The pattern of refractive error is shown in table 2. Simple Myopia was the commonest form of refractive error followed by Compound astigmatism. The least commonly seen is the mixed astigmatism. Different types of Orthoptic disorders seen are convergence insufficiency, strabismus and amblyopia, the convergence insufficiency being the commonest one (44.5%) followed by strabismus (36.5%). Among the 41 (2.2%) students who had color blindness, 32 (78%) were strong Deutans and 6 (14.6%) were total color blinds.

Table 1: Pattern of ocular morbidity

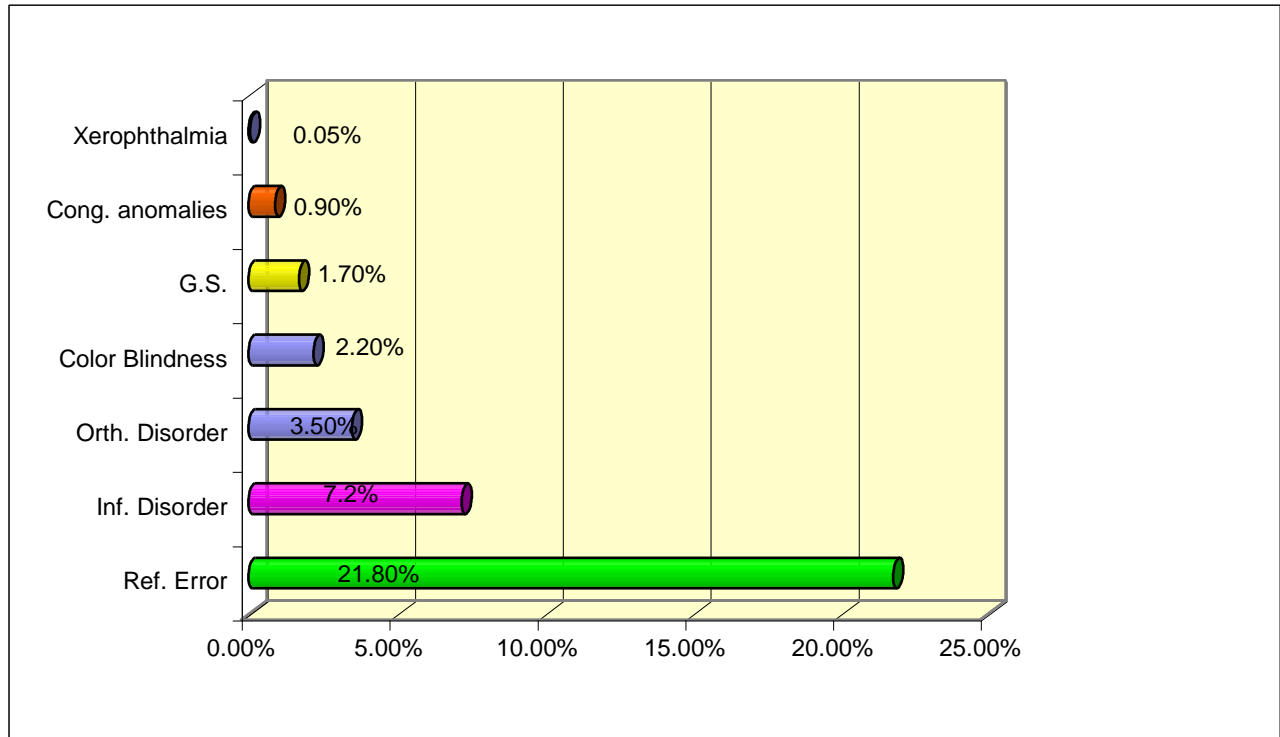


Table 2: Pattern of refractive error

| Type | Number | % Out of total |
|----------------------|-------------|----------------|
| Simple myopia | 183 (46.3%) | 10.1% |
| Simple hypermetropia | 50 (12.6%) | 2.8% |
| Simple astigmatism | 74 (18.6%) | 4.1% |
| Compound astigmatism | 83 (21.3%) | 4.6% |
| Mixed astigmatism | 5 (1.2%) | 0.3% |
| Total | 395 (100%) | 21.8% |

Chart 1: Showing Pattern of Refractive Error

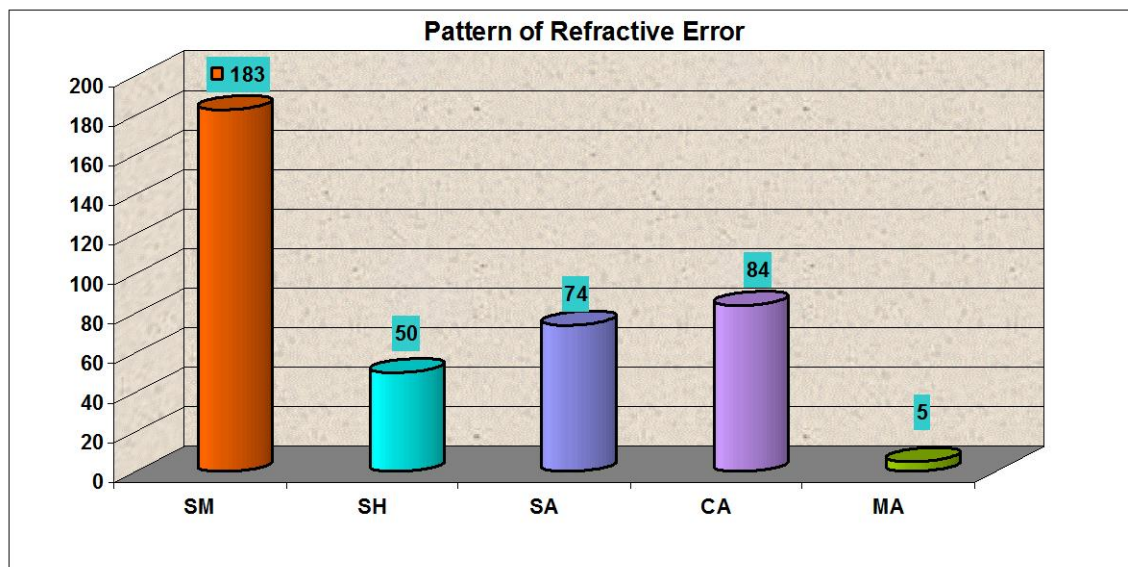


Table 3: Pattern of Orthoptic disorder:

| SN | Type | Number | % out of Total |
|--------------|---------------------|--------|----------------|
| 1 | Strabismus (36.5%) | 23 | 1.3 |
| | Divergent | 20 | |
| | Convergent | 2 | |
| | Duane's | 1 | |
| 2 | Amblyopia (19.0%) | 12 | 0.7 |
| | Refractive | 11 | |
| | Strabismic | 1 | |
| 3 | Convergence (44.5%) | 28 | 1.5 |
| Total | | 63 | 3.5 |

Table 4: Pattern of color blindness

| Type | Number |
|-----------------------|------------|
| Total color blindness | 6 (14.6%) |
| Strong Deutan | 32 (78.0%) |
| Mild Deutan | 2 (4.9%) |
| Mild Protan | 1 (2.4%) |
| Total | 41 (100%) |

DISCUSSION:

The spectrum of various types of refractive disorder is the major contributory factor in ocular morbidity. The prevalence of ocular morbidity was 34.2%, which was almost three times greater than the prevalence quoted by B.P. Nepal et al. (11%)⁷ but slightly lower than the prevalence quoted by S Chaturvedi, and OP Agarwal (over 40%)⁹. These large differences in ocular morbidity may be due to difference in examination method and diagnostic criteria used by various studies.

Refractive error was the commonest problem encountered in our study accounting for 21.8% out of total. B.P. Nepal et al too had reported the refractive error as the commonest problem among the Government school children, however the prevalence rate was just 8.1%. In rural Tanzania, a study of primary school children of age 7 to 19 years old had shown that the refractive error (1%)¹⁰ was not a significant problem. These differences in refractive error may be due to varying in teaching learning methodology and educational load to the students and also the varying methods of examination. In our study among the refractive error, myopia alone accounted for 10.1% which was similar to the prevalence quoted by K Zadnik et al. (10.1%)¹¹ but higher than that quoted by B.P. Nepal et al. (4.3%)⁷. Following myopia, astigmatism (9.0%) was the second common type of refractive error, which was well comparable with findings in Mexico (9.5%)¹² and southern India (10.3%)¹³.

Infective disorder (7.2%) was the second commonest cause of ocular morbidity in our study, which included blepharitis, meibominitis and conjunctivitis etc.

Among Orthoptic disorders (3.5%), convergence insufficiency (1.5%) was seen most frequently which was then followed by strabismus (1.3%) and amblyopia (0.7%). In the study done by Rouse MW et al in USA, they had found higher prevalence of convergence insufficiency (4.2%)²². Strabismus (1.3%) was the second common type of orthoptic disorder in our study which was comparable to the findings of BP Nepal et al.⁷ but much less in comparison to the findings of Baltimore Vision Screening Project, USA (3.2%)¹⁴. In our study divergent squint was the commonest type of strabismus as opposed to convergent squint. Exotropia was commoner than esotropia in studies in Chile¹⁵ and Hong Kong¹⁶. We found the prevalence of amblyopia 0.7% and most common cause was refractive error. Among the students with refractive error, 2.9% had already developed amblyopia though this figure is lower than that of the findings of BP Nepal et al who had found 12.4%, which may be due to more aware parents of private school going children than parents of government school going children.

Color Vision Defect (CVD) (2.2%) was another important ocular morbidity, which had not been evaluated by previous researchers in Nepal. We found color vision defect only in males but not in females. Our prevalence was lower than the prevalence found in India (3.83% male and 0.13% female)¹⁷ (3.85% males and 0.38% females)¹⁸, in Korea (5.90% men, 0.44% women)¹⁹ and in Tehran (8.18% males and 0.43% females)²⁰. Deutan CVD (1.76%) was the most common type of CVD in our study, which was similar to the other part of the world like in India (1.69% deutan defect in males and all CVD females were deutanomaly)¹⁷, in Saudi Arabia (1.95% deutan defect)²¹.

Congenital anomalies were seen in 0.9% of the total students. This value is higher than the findings of BP Nepal et al (0.36%)⁷. Xerophthalmia was seen in one (0.05%) of the total cases which was less than the findings of Nepal Blindness Survey (0.76%)⁴, GP Pokhrel from eastern Nepal (0.67%)⁶, and BP Nepal et al. (0.36%)⁷ but incomparable to the finding of Nepal Xerophthalmia Survey (1.65%)⁵. Reporting of higher prevalence of xerophthalmia by the Xerophthalmia Survey but lower prevalence shown by various studies conducted in Nepal could be due to active preventive measures, which were taken after the national survey.

CONCLUSION:

The prevalence of refractive error among private school going children seems to be higher as compared to other reports emerging from Government schools. Refractive error is the main cause of amblyopia. Color blindness also seems to be prevalent among these children. This kind of school screening would help in detecting the eye problems timely and thus would reduce the ocular morbidity as well as prevents children from going blind unnecessarily. There is a further need to conduct a comparative study between private and government schools to support this finding in future.

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